

Online Supplemental Appendix for  
“Remedial Enrollment during First Year of College, Institutional Transfer, and Degree Attainment”  
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TABLE A1  
Descriptive Statistics of Covariates ( $n=3,129$ )

Variables	Mean	Standard Deviation	Range	% of missing
<i>Demographics</i>				
Female	.514	.500	0-1	0
White (base group)	.693	.461	0-1	0
Black	.137	.344	0-1	0
Hispanic	.110	.313	0-1	0
Other race	.059	.236	0-1	0
Age when starting college	19.573	2.557	16.000-31.333	0
Cognitive score (ASVAB)	60.086	26.582	0-100	15.28
Parent’s highest education (years)	14.396	2.804	1-20	2.88
Ratio of household income to poverty level	378.066	355.936	0-3227	14.48
Mother’s age at 1 <sup>st</sup> birth	24.035	4.671	11-44	6.46
Intact family (at age 17; dummy)	.568	.495	0-1	0
Census region of residence (at age 17)				
Northeastern (base group)	.166	.372	0-1	0
North Central	.277	.447	0-1	0
South	.342	.474	0-1	0
West	.215	.411	0-1	0
<i>Pre-college schooling experience (dummy)</i>				
Ever repeated a grade (du	.099	.299	0-1	16.40
Never late for school (in 1996)	.656	.475	0-1	0.93
Never absent from school (in fall 1996)	.220	.414	0-1	2.21
25% or less peers who cut classes or school (in 1997)	.639	.480	0-1	0.32
75% or more peers who plan to go to college (in 1997)	.625	.484	0-1	0.86
<i>High school academic preparation</i>				
School sector				
Public (base group)	.926	.261	0-1	22.05
Catholic	.041	.198	0-1	22.05
Other private	.033	.178	0-1	22.05
Participated in gifted course program	.252	.434	0-1	30.46
Academic program				
College preparatory	.438	.496	0-1	25.98
General education (base group)	.326	.469	0-1	25.98
Vocational education	.236	.424	0-1	25.98
Math pipeline – high level (dummy)	.467	.499	0-1	21.67
Science pipeline – high level (dummy)	.354	.478	0-1	21.67
Total academic credits	17.838	5.499	0-32	40.24
Overall grade point average (GPA)	2.992	.665	0-4.08	40.24
English GPA	2.850	.859	0-4.19	40.24
Math GPA	2.698	.836	0-4.08	40.24
<i>College Attendance</i>				
On-time college-going (dummy)	.693	.461	0-1	8.15
College sector				
Public (base group)	.783	.412	0-1	7.57
Private non-profit	.158	.365	0-1	7.57
Private for-profit	.055	.228	0-1	7.57

TABLE A1 (*continued*)  
Descriptive Statistics of Covariates ( $n=3,129$ )

Variables	Mean	Standard Deviation	Range	% of missing
College major				
STEM	.184	.386	0-1	7.57
Social/Behavioral sciences	.130	.336	0-1	7.57
Art and humanities	.072	.259	0-1	7.57
Law and business	.140	.348	0-1	7.57
Education	.060	.237	0-1	7.57
Health sciences	.094	.292	0-1	7.57
Other vocational (e.g., mechanic, transportation, etc.)	.005	.073	0-1	7.57
Not declared yet (base group)	.316	.465	0-1	7.57
Number of courses taken in first year	8.775	4.258	1-20	0

*Source.* National Longitudinal Survey of Youth 1997 (NLSY97)

*Note.*  $n$  = sample size; AVSAB = Armed Services Vocational Aptitude Battery; STEM = science, technology, engineering, and mathematics. Sample is restricted to first-time college students who had valid information on their college's institutional level. Data are weighted to be generalizable to the population of youth aged 12-16 in 1996 in the United States.

TABLE A2  
ANOVA Results of Covariate Balance Tests across Four Weighted Treatment Groups

Covariates	Two-Year College		Four-Year College	
	n = 1,389		n = 1,538	
	F	p-value	F	p-value
Female	1.39	0.243	0.40	0.750
Black	0.64	0.589	3.56	0.066
Hispanic	1.31	0.270	1.28	0.278
Other race	0.40	0.752	1.81	0.143
Age when starting college	0.70	0.554	0.57	0.633
Cognitive score (ASVAB)	0.08	0.972	0.57	0.634
Parent's highest education (years)	0.75	0.522	0.66	0.579
Ratio of household income to poverty level	0.35	0.787	0.04	0.988
Mother's age at 1 <sup>st</sup> birth	1.45	0.227	0.79	0.500
Non-intact family (at age 17; dummy)	0.54	0.652	1.52	0.208
Census region of residence (at age 17)				
North Central	0.33	0.805	0.68	0.564
South	0.29	0.836	0.53	0.659
West	0.65	0.584	0.77	0.512
Ever repeated a grade	1.41	0.237	0.59	0.622
Never late for school (in 1996)	0.46	0.707	0.91	0.434
Never absent from school (in fall 1996)	1.15	0.330	1.68	0.169
25% or less peers who cut classes or school (in 1997)	0.32	0.808	0.74	0.527
75% or more peers who plan to go to college (in 1997)	2.27	0.079	1.30	0.272
School sector				
Catholic	0.06	0.981	0.34	0.794
Other private	0.28	0.840	0.59	0.619
Participated in gifted course program	0.45	0.715	0.04	0.988
Academic program				
College preparatory	0.12	0.950	0.55	0.647
Vocational education	1.03	0.376	1.56	0.198
Math pipeline – high level (dummy)	0.08	0.968	0.27	0.845
Science pipeline – high level (dummy)	0.29	0.834	0.58	0.625
Total academic credits	0.82	0.483	0.43	0.728
Overall grade point average (GPA)	0.55	0.650	0.55	0.647
English GPA	0.82	0.481	0.39	0.761
Math GPA	0.30	0.829	0.68	0.567
On-time college-going (dummy)	0.78	0.505	3.70	0.011
College sector				
Private non-profit	0.43	0.731	0.52	0.669
Private for-profit	0.98	0.402	1.68	0.169
College major				
STEM	0.50	0.686	0.39	0.759
Social/Behavioral sciences	0.72	0.540	0.86	0.462
Art and humanities	0.29	0.835	0.41	0.749
Law and business	0.03	0.992	1.44	0.229
Education	0.15	0.931	2.24	0.082
Health sciences	0.81	0.491	0.14	0.935
Other vocational (e.g., mechanic, transportation, etc.)	0.48	0.696	0.53	0.662
Number of courses taken in first year	1.64	0.177	0.38	0.767

Source. National Longitudinal Survey of Youth 1997 (NLSY97)

Note. n = sample size; AVSAB = Armed Services Vocational Aptitude Battery; STEM = science, technology, engineering, and mathematics.

TABLE A3

## Sensitivity Tests of Estimated Effects of Postsecondary Remediation Effects: Traditional Students Only

Dependent Variable	Remediation Enrollment					
	Two-Year College			Four-Year College		
	Only Math	Only English	Both Subjects	Only Math	Only English	Both Subjects
Transferring						
Transferred up by 2 <sup>nd</sup> year	0.014 (0.057)	-0.025 (0.046)	0.011 (0.047)	--	--	--
Transferred up by 3 <sup>rd</sup> year	0.095 (0.073)	0.048 (0.058)	0.105 * (0.051)	--	--	--
Transferred down by 2 <sup>nd</sup> year	--	--	--	0.088 *** (0.023)	0.125 *** (0.022)	0.080 *** (0.018)
Transferred down by 3 <sup>rd</sup> year	--	--	--	0.125 *** (0.030)	0.143 *** (0.025)	0.121 *** (0.027)
College Attainment						
Earned AA within 3 years	0.086 (0.054)	0.170 ** (0.063)	0.067 ** (0.025)	--	--	--
Earned AA within 4 years	0.108 † (0.059)	0.163 * (0.064)	0.108 *** (0.029)	--	--	--
Earned BA within 4 years	--	--	--	-0.089 (0.065)	-0.005 (0.058)	-0.096 (0.063)
Earned BA within 6 years	0.033 (0.061)	0.045 (0.052)	0.076 (0.049)	-0.015 (0.080)	0.058 (0.073)	-0.030 (0.076)
Earned BA within 8 years	0.127 † (0.076)	0.064 (0.054)	0.120 * (0.050)	-0.090 (0.079)	0.005 (0.072)	-0.065 (0.074)
Number of observations		431			1,018	

*Note.* AA = associate's degree; BA = bachelor's degree. Each cell in the table shows the estimate on a dummy variable indicating the effect of a specific type of remediation enrollment by subject, using "no remediation" as the reference group. Robust standard errors are reported in parentheses.

\*\*\* p<.001; \*\* p<.01; \* p<.05; †p < .10 (two-tailed test).

TABLE A4

Sensitivity Tests of Estimated Effects of Postsecondary Remediation Effects: Excluding Oversampled Minority Students

Dependent Variable	Remediation Enrollment					
	Two-Year College			Four-Year College		
	Only Math	Only English	Both Subjects	Only Math	Only English	Both Subjects
Transferring						
Transferred up by 2 <sup>nd</sup> year	-0.015 (0.033)	0.006 (0.031)	0.035 (0.032)	--	--	--
Transferred up by 3 <sup>rd</sup> year	0.043 (0.045)	0.018 (0.036)	0.073 * (0.037)	--	--	--
Transferred down by 2 <sup>nd</sup> year	--	--	--	0.065 *** (0.019)	0.098 *** (0.018)	0.061 *** (0.016)
Transferred down by 3 <sup>rd</sup> year	--	--	--	0.099 *** (0.027)	0.125 *** (0.021)	0.114 *** (0.025)
College Attainment						
Earned AA within 3 years	0.011 (0.029)	0.051 † (0.028)	0.010 (0.022)	--	--	--
Earned AA within 4 years	0.010 (0.039)	0.049 (0.037)	0.027 (0.033)	--	--	--
Earned BA within 4 years	--	--	--	-0.138 ** (0.051)	-0.048 (0.044)	-0.175 *** (0.047)
Earned BA within 6 years	-0.006 (0.040)	0.007 (0.039)	0.025 (0.035)	-0.053 (0.060)	0.042 (0.050)	-0.088 (0.056)
Earned BA within 8 years	0.035 (0.044)	0.031 (0.040)	0.065 † (0.037)	-0.067 (0.060)	0.062 (0.051)	-0.054 (0.056)
Number of observations		1,053			1,243	

Note. AA = associate's degree; BA = bachelor's degree. Each cell in the table shows the estimate on a dummy variable indicating the effect of a specific type of remediation enrollment by subject, using "no remediation" as the reference group. Robust standard errors are reported in parentheses.

\*\*\* p<.001; \*\* p<.01; \* p<.05; †p < .10 (two-tailed test).

TABLE A5

Robust Standard Errors for Heterogeneous Effects of Postsecondary Remediation by Race/Ethnicity and Z-Scores for Tests of Significant Difference

	Robust Standard Errors						Z-Scores		
	(1)	(2)	(3)	(4)	(5)	(6)	(1) - (4)	(2) - (5)	(3) - (6)
	Only Math	Only English	Both Subjects	Only Math	Only English	Both Subjects	Only Math	Only English	Both Subjects
	Parents' highest education: HS or below			Parents' highest education: Above HS			Difference between subgroups		
Two-year college									
Transferred up by 2 <sup>nd</sup> year	0.021	0.022	0.023	0.030	0.033	0.036	0.908	0.332	-0.279
Transferred up by 3 <sup>rd</sup> year	0.046	0.025	0.025	0.041	0.045	0.045	-0.443	-0.720	-1.374
Earned AA within 3 years	0.037	0.023	0.021	0.040	0.047	0.038	1.446	-0.964	1.581
Earned AA within 4 years	0.046	0.030	0.028	0.047	0.055	0.045	0.960	-0.786	0.080
Earned BA within 6 years	0.025	0.024	0.023	0.041	0.045	0.043	0.546	0.132	0.418
Earned BA within 8 years	0.030	0.027	0.026	0.047	0.046	0.045	0.737	0.345	-0.024
	Parents' highest education: Below BA			Parents' highest education: BA or above			Difference between subgroups		
Four-year college									
Transferred up by 2 <sup>nd</sup> year	0.023	0.022	0.016	0.027	0.024	0.045	-0.747	0.457	0.407
Transferred up by 3 <sup>rd</sup> year	0.032	0.026	0.026	0.045	0.030	0.051	0.326	0.603	0.139
Earned BA within 4 years	0.053	0.052	0.052	0.097	0.082	0.092	0.973	-0.143	1.456
Earned BA within 6 years	0.077	0.069	0.068	0.077	0.061	0.073	-0.072	-1.451	-0.205
Earned BA within 8 years	0.076	0.068	0.066	0.073	0.056	0.067	0.317	-1.797	-0.559

Note. AA = associate's degree; BA = bachelor's degree; HS = high school. "No remediation" is the reference group.

TABLE A6

Robust Standard Errors for Heterogeneous Effects of Postsecondary Remediation by Parental Education and Z-Scores for Tests of Significant Difference

	Robust Standard Errors						Z-Scores		
	(1)	(2)	(3)	(4)	(5)	(6)	(1) - (4)	(2) - (5)	(3) - (6)
	Only Math	Only English	Both Subjects	Only Math	Only English	Both Subjects	Only Math	Only English	Both Subjects
	Non-white			White			Difference between subgroups		
Two-year college									
Transferred up by 2 <sup>nd</sup> year	0.019	0.014	0.014	0.031	0.030	0.033	0.492	-0.303	-0.702
Transferred up by 3 <sup>rd</sup> year	0.030	0.024	0.018	0.053	0.047	0.039	1.899	-0.602	-1.088
Earned AA within 3 years	0.024	0.013	0.011	0.038	0.047	0.031	1.890	-0.115	1.750
Earned AA within 4 years	0.052	0.041	0.036	0.040	0.047	0.035	2.007	0.144	1.698
Earned BA within 6 years	0.016	0.023	0.014	0.037	0.048	0.033	1.333	0.510	0.062
Earned BA within 8 years	0.028	0.025	0.021	0.040	0.049	0.037	1.094	0.356	-0.019
	Non-white			White			Difference between subgroups		
Four-year college									
Transferred up by 2 <sup>nd</sup> year	0.026	0.028	0.017	0.027	0.021	0.021	0.338	-0.246	-1.298
Transferred up by 3 <sup>rd</sup> year	0.042	0.031	0.025	0.031	0.025	0.035	0.471	0.453	-0.349
Earned BA within 4 years	0.076	0.069	0.066	0.058	0.048	0.056	0.823	1.936	2.328
Earned BA within 6 years	0.108	0.100	0.095	0.063	0.048	0.060	-0.119	0.304	0.261
Earned BA within 8 years	0.117	0.110	0.105	0.062	0.047	0.058	-0.161	0.409	0.276

Note. AA = associate's degree; BA = bachelor's degree; HS = high school. "No remediation" is the reference group.